

What are dynamic capabilities and are they a useful construct in strategic management?

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The dynamic capability perspective extends the resource-based view argument by addressing how valuable, rare, difficult to imitate and imperfectly substitutable resources can be created and how the current stock of valuable resources can be refreshed in changing environments. The concept of dynamic capabilities emerged in the 1990s, and the field has advanced considerably since. This paper presents a review as well as a synthesis of the extant literature. This synthesis first highlights, that dynamic capabilities are shaped by enabling and inhibiting variables within and outside the firm, including the perceptions and motivations of managers; secondly, it identifies processes that create dynamic capabilities; and thirdly, it explains that dynamic capabilities do not automatically lead to performance improvements. Finally, the paper addresses some areas of confusion and contradiction that hamper the development of the literature.

Introduction

The field of strategic management is largely concerned with how firms generate and sustain competitive advantage. The resource-based view (RBV) argues that resources that are simultaneously valuable, rare, imperfectly imitable and imperfectly substitutable (VRIN) are a source of competitive advantage (Barney 1991, 1995). The underlying assumptions on which the RBV of the firm is based are that resources are heterogeneous across organizations and that this heterogeneity can sustain over time. It is a theory to explain how some firms are able to earn super-profits in equilibrium and, as such, it is essentially a static view (Barney 2001a,b; Priem and Butler 2001; Lockett *et al.* 2009). It does not specifically address how future valuable resources could be created or how the current stock of VRIN resources can be refreshed in changing environments: this is the concern of the dynamic capability perspective. This perspective is argued to be an extension of the RBV; it shares similar assumptions (Barney 2001b), and it helps us understand how a firm's resource stock evolves over time and thus how advantage is sustained. The dynamic capability perspective focuses on the capacity an organization facing a rapidly changing environment has to create new resources, to renew or alter its

resource mix (Teece *et al.* 1997), and it acknowledges that 'the top management team and its beliefs about organizational evolution may play an important role in developing dynamic capabilities' (Rindova and Kotha 2001, 1274).

How firms change, sustain and develop competitive advantage and capture value are critical concerns to both practitioners and academics alike and, while many fields address change-related issues (e.g. organization learning, cognition, innovation etc.) none, except the dynamic capability perspective, specifically focuses on how firms can change their valuable resources over time and do so persistently. This is why the perspective is attracting increasing attention. Increasing numbers of journal articles, special issues and conference presentations have been devoted to dynamic capabilities, and hence we believe this is a good time to take stock of this literature. By pausing to review where we are with this construct, we hopefully can provide some guidance as to how scholars can progress these ideas through further empirical and conceptual development, and through the development of useable prescriptions for executives.

We make several contributions in this paper. First, we draw from the literature the necessary elements allowing us to develop a thorough understanding of what the dynamic capability perspective is about. This allows us to highlight what is within its scope and what is beyond it. Secondly, we review some of the inconsistencies in the literature and offer some suggestions. We emphasize that dynamic capabilities do not equate with sustainable competitive advantage and that 'dynamic' refers to the environment rather than the capability. Thirdly, we explain that dynamic capabilities and their antecedents are different constructs, and we provide a list of the main external and internal 'enablers and inhibitors' which impact on the deployment of dynamic capabilities. Fourthly, we critically evaluate the utility of the concept to the field of strategic management and, finally, we synthesize the literature and our thinking in a model that focuses on the position of dynamic capabilities in the value creation process.

The figure allows us to consider dynamic capabilities in the firm value creation process. It shows the various impacts on performance that they may have as well as indicating moderating variables that affect the deployment of dynamic capabilities. Our synthesis of the literature also leads us to the view that, although there have been theoretical advances in this field, that are still rather too many incompletely answered or unanswered questions. This reduces the field's ability to impact management practice. We identify five key questions at the end of the paper which could benefit from some further theoretical and empirical research. We conclude that a dynamic capabilities perspective provides a valuable focus on change processes within the firm. However,

owing to a lack of empirical work and problems in deriving managerial prescriptions from the perspective, it currently has limited utility.

An Overview of the Origin of the Dynamic Capability Perspective

Teece *et al.*'s (1990) working paper is probably the first contribution developing explicitly the notion of dynamic capabilities. They wrote (1990, 11) that 'our view of the firm is somewhat richer than the standard resource-based view ... it is not only the bundle of resources that matter, but the mechanisms by which firms learn and accumulate new skills and capabilities, and the forces that limit the rate and direction of this process'. These ideas were first formally published in 1994 by Teece and Pisano. They explained that the RBV was not able to provide explanations as to how some successful firms demonstrated 'timely responsiveness and rapid and flexible product innovation, along with the management capability to effectively coordinate and redeploy internal and external competences' (Teece and Pisano 1994, 537). They pointed out that it is essential to consider the changing nature of the external environment and hence the role of strategic management, which is principally about 'adapting, integrating and reconfiguring internal and external organizational skills, resources and functional competencies toward the changing environment' (1994, 537). Their argument derived from a realization that many once successful firms were struggling or failing as their environments changed; they were unable to adapt successfully (Harreld *et al.* 2007). The 1990 and 1994 work was then elaborated upon in Teece *et al.* (1997) when they explicitly argued how the dynamic capability view could overcome the limitations of the RBV. They then defined dynamic capabilities as 'the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments' (1997, 516).

While Teece and Pisano could be seen to be the instigators of the dynamic capabilities perspective, their work extends Nelson and Winter's (1982) *An Evolutionary Theory of Economic Change*, which addressed the role of routines and how they shape and constrain the ways in which firms grow and cope with changing environments. Both Teece *et al.* (1997) and Nelson and Winter (1982) take an efficiency approach to firm performance rather than a privileged market position approach (the latter being the underpinning for Porter's (1980) theory of competitive advantage). They also both emphasize internal factors of the firm rather than external factors as sources of competitive advantage. Also like Nelson and Winter (1982), Teece *et al.* (1997) highlight the importance of path dependencies, and the need to reconfigure a firm's resources to enable the firm to change and evolve.

Unsurprisingly, because the dynamic capability perspective is ultimately about understanding a firm's survival and growth, it inevitably draws from a range of theoretical perspectives, not just evolutionary economics. The approach also builds on the work of Schumpeter (1934) on processes of creative destruction and innovation-based competition, Cyert and March's (1963) work on the behavioural aspects of firms, Williamson (1975, 1985) on markets and hierarchies and asset specificity, and Teece (1982) and Rumelt (1984) on the role of firm-specific assets and isolating mechanisms.

Finally, to close this section, we should like to address the relationship of the dynamic capability perspective to the RBV. As mentioned in the Introduction, the dynamic capability view shares similar assumptions to the RBV, and it can be considered as an extension of RBV thinking, as can other related theories, notably the knowledge-based view (Grant, 1996) and the core competence perspective (Prahalad and Hamel, 1990). They all consider the firm to be a bundle of heterogeneous and path-dependent resources, and they all address the way in which this allows a firm to generate sustainable competitive advantage (Lockett and Thompson 2001). To use Hoskisson *et al.*'s (1999) expression, they are all on the same side of the pendulum and their foundations can be traced back to Penrose (1952, 1959) and her theory of the growth of the firm.

There are a number of publications that explore the link between Penrose and the RBV (e.g. Augier and Teece 2007; Kor and Mahoney 2004; Lockett 2005; Lockett and Thompson 2004; Pitelis 2007) and any review of the dynamic capabilities perspective should address the contribution of Penrose's groundbreaking ideas.

As summarized by Lockett (2005, 85), Penrose considered firms as 'administrative organizations that are collections of heterogeneous productive resources that have been historically determined'. From this definition, the inextricable link between Penrose's work and the RBV is clear. The basic assumptions are the same. Could the same be asserted for the dynamic capability perspective? Penrose emphasizes that value creation does not come from the possession of the resources but from their *use*, and how much value is created would depend on how these resources are deployed, i.e. how they are combined within the firm. She also argues that, to grow, firms need to keep developing their expertise and to innovate, and that managers need to have entrepreneurial skills rather than managerial skills: 'an entrepreneurial competence is a function of imagination whereas a managerial competence is largely practical execution' (Lockett 2005, 95). As we will see later, this would suggest that managerial skills allow firms to run an existing firm, but they are not suited to change and to the creation of advantage. Finally, she suggests that managers are the ultimate constraint to the growth of a firm,

as managers are limited by their knowledge of their firm's resource base and their understanding of their external environment (Lockett and Thompson 2004). As we have summarized in the Introduction, and as we shall see in more detail in what follows, these ideas are pertinent to the dynamic capability perspective, and hence the importance of the legacy of Penrose needs to be acknowledged (Augier and Teece 2007; Lockett 2005).

Defining and Understanding Dynamic Capabilities

As explained in the Introduction, to sustain their competitive advantage, firms need to renew their stock of valuable resources as their external environment changes. Dynamic capabilities allow firms to effect these ongoing changes. As Winter (2003) explains, dynamic capabilities govern the rate of change of a firm's resources and notably its VRIN resources. Those VRIN resources, i.e. the firm's resource base, enable a firm to achieve sustained competitive advantage. Here, in line with Barney (1991) and Helfat *et al.* (2007), a resource is defined in its broad sense, and hence it includes activities, capabilities, etc., which allow the firm to generate rents. If a firm possesses VRIN resources but does not use any dynamic capabilities, its superior returns cannot be sustained; without dynamic capabilities, a firm's returns may be short lived if the environment exhibits any significant change. Dynamic capabilities allow firms continually to have a competitive advantage and may help firms to avoid developing core rigidities which inhibit development, generate inertia and stifle innovation (Leonard-Barton 1992). Core rigidities are the flipside of VRIN resources: they are resources that used to be valuable but have become obsolete and inhibit the development of the firm. In other words, they are resources that have not been appropriately adapted, upgraded or restructured through dynamic capabilities. We discuss this later in the section on dynamic capabilities and competitive advantage, and we now proceed to explore differing definitions of dynamic capabilities.

Definitions

Since Teece *et al.*'s (1997) original contribution, many authors have offered their own definitions of dynamic capabilities. They are, as can be seen below, adaptations of Teece *et al.*'s original definition: 'the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments' (Teece *et al.* 1997, 516). A few examples are as follows.

- Dynamic capabilities are 'The firm's processes that use resources – specifically the processes to integrate, reconfigure, gain and release resources – to match or even create market change. Dynamic capabilities thus are the organizational and

strategic routines by which firms achieve new resources configurations as markets emerge, collide, split, evolve and die' (Eisenhardt and Martin 2000, 1107).

- 'A dynamic capability is a learned and stable pattern of collective activity through which the organization systematically generates and modifies its operating routines in pursuit of improved effectiveness' (Zollo and Winter 2002, 340).
- Dynamic capabilities 'are those that operate to extend, modify or create ordinary capabilities' (Winter 2003, 991).
- They are 'the abilities to reconfigure a firm's resources and routines in the manner envisioned and deemed appropriate by its principal decision-maker' (Zahra *et al.* 2006, 918).
- More recently, Wang and Ahmed (2007, 35) have defined dynamic capabilities as 'a firm's behavioural orientation constantly to integrate, reconfigure, renew and recreate its resources and capabilities and, most importantly, upgrade and reconstruct its core capabilities in response to the changing environment to attain and sustain competitive advantage'.
- Helfat *et al.* (2007, 1) offer this definition: 'the capacity of an organization to purposefully create, extend or modify its resource base'.

Listing these definitions allows us to highlight that there generally is consensus about the dynamic capability construct. These definitions reflect that dynamic capabilities are organizational processes in the most general sense and that their role is to change the firm's resource base. The literature also explains that dynamic capabilities are built rather than bought in the market (Makadok 2001), are path dependent (Zollo and Winter 2002) and are embedded in the firm (Eisenhardt and Martin 2000).

These definitions also show us what dynamic capabilities are *not*. First, Winter (2003), Helfat *et al.* (2007) and Schreyögg and Kliesch-Eberl (2007) emphasize that a dynamic capability is not an ad hoc problem-solving event or a spontaneous reaction. It must contain some patterned element, i.e. it must be repeatable. Zollo and Winter (2002, 340) also make the point that dynamic capabilities are persistent and that 'an organization that adapts in a creative but disjointed way to a succession of crises is not exercising a dynamic capability'. Secondly, Zahra *et al.*'s (2006) and Helfat *et al.*'s (2007) definitions also clearly show that luck does not constitute a dynamic capability. They highlight that the use of dynamic capabilities is intentional, deliberate. Thirdly, the definitions show that, while dynamic capabilities are concerned with strategic change, they are not a synonym for it. They are about one type of change, the intentional change of the resource base.

Finally, to end this section, these definitions have allowed us to clarify that dynamic capabilities describe intentional efforts to change the firm's resource base. We cannot equate strategic change or resource creation or renewal with dynamic capabilities alone. These changes may occur through emergent processes that have not been deliberately deployed by managers (Mintzberg and McHugh 1985), or they could result from ad hoc interventions (Winter 2003) or because of luck (Barney 1991). One interesting question to address in the future would be the extent to which new resources are created or renewed because of the above factors or because of dynamic capabilities.

In the next section, we summarize some of the typologies of capabilities that can be found in the literature. This will allow us to get a better grasp of the differences between capabilities and dynamic capabilities.

Typologies of Capabilities

Dynamic capabilities and capabilities are considered to be distinct constructs, and some authors have proposed typologies of capabilities. Collis (1994) proposed four categories of capabilities. The first 'are those that reflect an ability to perform the basic functional activities of the firm' (1994, 145); they are the firm resources in the broad sense. The second category concerns dynamic improvements to the activities of the firm. The third category is, as stated by Collis (1994), closely related and difficult to differentiate from the second category. It is also about dynamic improvement but specifically about being able 'to recognise the intrinsic value of other resources or to develop novel strategies before competitors' (Collis 1994, 145). Both Collis's second and third categories are dynamic capabilities (in view of Teece *et al.*'s (1997) definitions). They relate to the modification and the creation and extension of the resource base. The fourth category is labelled 'higher order' or 'meta-capabilities', and it relates to learning-to-learn capabilities. Collis (1994) also states that meta-capabilities can go on *ad infinitum*; there is a kind of infinite wave of capability to renew the capability that renews the capability, etc. He also suggests that ultimately to outperform competitors, firms do need to deploy these meta-capabilities: 'the capability that wins tomorrow is the capability to develop the capability to develop the capability that innovates faster (or better), and so on' (Collis 1994, 148).

Winter (2003) proposes that there are zero-level capabilities, also called operational or ordinary capabilities, which he defines as those that permit the firm to earn a living in the present. They are Collis's (1994) first level, in other words the extant resource base. Then he explains that there are first-level capabilities which modify and change zero-level capabilities. These are dynamic capabilities. He also suggests, similarly to Collis

(1994), that there are higher capabilities which operate on the first level capabilities. So both Collis (1994) and Winter (2003) extend Teece *et al's* original formulation to distinguish between three main levels of capability. Danneels (2002) and Zahra *et al.* (2006) also use similar typologies.

Definitions: Some Sources of Confusion

Before proceeding we should like to comment on some of the sources of confusion in the dynamic capabilities literature and to make some observations about the term 'dynamic capabilities' itself. The two words making up the expression dynamic capabilities are sometimes interpreted differently. To understand the confusion, it is worth considering each word in turn.

First, what does the noun 'capabilities' means in the expression dynamic capabilities? The literature is clear that capabilities are processes. This is not a source of misunderstanding; the problem may lie in the fact that 'capability' in 'dynamic capability' should not be separated from the adjective 'dynamic'. Expressed differently the easiest way maybe to think about this is to forget what a capability is, as normally defined in the RBV, and not to decompose the expression into two words but to see it as one. A dynamic capability is not a capability in the RBV sense, a dynamic capability is not a resource. A dynamic capability is a process that impacts upon resources. Dynamic capabilities are about developing the most adequate resource base. They are future oriented, whereas capabilities are about competing today, and they are 'static' if no dynamic capabilities are deployed to alter them. This question about the meaning of 'dynamic' and 'capabilities' is not merely a semantic problem. If, as more contributors agree, dynamic capabilities consist of repeated processes that have evolved through time, this suggests that dynamic capabilities are in one sense quite stable phenomena. Similarly, the RBV focuses our attention on resources that are stable and enduring sources of advantage. If dynamic capabilities act upon the resource base, we have a stable phenomenon (the dynamic capability) impacting on another stable phenomenon (the resource base). Thus the dynamism does not consist in either the dynamic capability or the resource base. The 'dynamism' relates to how the resource base is changed in a dynamic environment by the use of dynamic capabilities. Put differently, it means that the dynamism consists in the interaction of the dynamic capability and resource base, allowing the modification of this resource base.

In the RBV, capabilities are either processes by which the resources are utilized (Amit and Shoemaker 1993) or they are resources in the general sense. Following Barney (1991), capabilities are a type of resource and hence are included in his broad definition

of resources. A valuable resource base (and hence capabilities) allows a firm to earn a living in the present, i.e. they are Winter's (2003) operating capabilities or zero-level capabilities or Zahra *et al.*'s (2006) substantive capabilities. Dynamic capabilities are processes that alter that resource base.

Secondly, what does the adjective 'dynamic' relate too? Various papers offer different interpretations. 'Dynamic' sometimes refers to environmental dynamism. This is incorrect, because dynamic capabilities can operate in relatively stable environments (we revisit environmental dynamism later in the discussion section). 'Dynamic' can relate to the capabilities themselves, i.e. they are capabilities that are dynamic, capabilities that change themselves over time. This is also incorrect. This comes from the confusion between dynamic capabilities and capabilities as resources (or operating capabilities, as we saw above). 'Dynamic' can refer to change in the resource base, to the renewal of resources. We should argue that this is the correct definition.

Examples of Dynamic Capabilities

The review so far shows that whatever definitions of dynamic capabilities one adheres to, there is a core element: the role of dynamic capabilities is to impact on the firm's extant resource base and transform it in such a way that a new bundle or configuration of resources is created so that the firm can sustain or enhance its competitive advantage. The value of dynamic capabilities derives from their *outputs*, i.e. the creation of a new set of valuable resources. In other words, a dynamic capability that does not result in the creation of resources that allow the firm to maintain or enhance its sustainable competitive advantage would not be valuable.

As shown by the definitions, there are different types of dynamic capabilities. Some are used to integrate resources, some to reconfigure resources; some are about creating new resources, while others are about shedding resources. Specifically, Bowman and Ambrosini (2003) building on Teece *et al.* (1997) explain that dynamic capabilities comprise four main processes: reconfiguration, leveraging, learning and creative integration. Reconfiguration refers to the transformation and recombination of assets and resources, e.g. the consolidation of central support functions that often occurs as a result of an acquisition. Leveraging involves replicating a process or system that is operating in one business unit into another, or extending a resource by deploying it into a new domain, for instance by applying an existing brand to a new set of products. Learning allows tasks to be performed more effectively and efficiently as an outcome of experimentation, reflecting on failure and success. Finally, creative integration relates to

the ability of the firm to integrate its assets and resources, resulting in a new resource configuration.

While these processes help us understand how dynamic capabilities operate, we still need to develop a better understanding of both the content and process of dynamic capabilities (Moliterno and Wiersema 2007). This being said there are several empirical and conceptual papers that have tried to explain precisely how some specific dynamic capabilities are used. Eisenhardt and Martin (2000) are strong in their assertions that dynamic capabilities, while often described in a vague manner, 'actually consist of identifiable and specific routines' (2000, 1107). They explain that examples can be found throughout the management literature. They show how acquisitions, alliances and product innovation can be seen to be 'real' dynamic capabilities, as they permit the renewal and reconfiguration of a firm's resources. They also add 'just as there are better ways to hit a golf ball or ski a mogul field, there are more or less effective ways to execute particular dynamic capabilities' (2000, 1108), suggesting that dynamic capabilities may not necessarily have the intended effect or a positive outcome. Likely reasons for this are the uncertainty in predicting the impact of a dynamic capability on the resource base and the uncertainties in the external environment. We address these issues later in the paper.

The growing literature on dynamic capabilities has given us an expanding set of specific examples. Studies tend to focus on specific dynamic capabilities; there are few studies that explore (a) whether dynamic capabilities always operate singly, (b) whether and how they can operate in combination, and (c) which dynamic capabilities might be more suitable, depending on each firm's situation.

Here are a few examples of empirical studies. Helfat (1997) argued, using the case of the US petroleum industry, that R&D was a dynamic capability. She showed that R&D activities were enhanced to respond to changes in market prices and examined the role of complementary resources in the effective deployment of R&D. Karim and Mitchell (2000) examined the acquisition process as a dynamic capability. They explained that acquisitions allow firms to reconfigure their mix of resources, that they are a means through which firms modify their resource base over time, allow them to overcome failure and exploit opportunities in their environment. Danneels (2002) studied how product innovation leads over time to organizational renewal, and hence it could be considered to be a dynamic capability. This argument is based on a study of five high-tech firms, which showed that new product development was connected to the development and renewal of firm-level competences and not only to the expansion of a firm's portfolio of products. Zahra and George (2002, 188) stated that absorptive

capacity was 'a dynamic capability that influences the firm's ability to create and deploy the knowledge necessary to build other organizational capabilities'; they explain that these capacities allow firms to create and exploit new knowledge and give them the flexibility to change and compete in dynamic and changing markets. Karim's (2006) research showed that organizational structure reconfiguration was a dynamic capability; by reconfiguring their business units, firms can recombine their resources and adapt to environmental changes. To give a final example, Moliterno and Wiersema (2007), using a data set of professional baseball franchises, argued that resource divestment was a dynamic capability. They concentrated on explaining the mechanisms of the 'human resource divestment' dynamic capability and suggested that managers' judgement, perceptions and the 'contextual feedback in the form of firm performance relative to aspirations' (2007, 1085) were critical to the deployment of this capability.

Searching and Sensing as Dynamic Capabilities

Before concluding this section and discussing the methodological issues associated with researching dynamic capabilities, we should like to comment on other types of dynamic capabilities described in the literature. Dynamic capabilities are sometimes argued to include search, i.e. identifying opportunities and threats, or the ability to sense changing customer needs, technological opportunities and competitive developments (Augier and Teece 2007; Teece 2007). While there is no doubt that these are important elements in dynamic capabilities, as we explain in the section on enablers and inhibitors of dynamic capabilities, these factors are not dynamic capabilities in and of themselves; they are managerial and organizational processes that underpin and enable the deployment of dynamic capabilities (Helfat *et al.* with Maritan 2007). They are, to use Teece's (2007) wording, the micro foundations of dynamic capabilities.

From the initial formulation of dynamic capabilities, which were processes that acted directly to re-shape and refresh the resources of the firm to enable it to sustain advantage in changing environments, a third level of capability which changes the firm's dynamic capabilities was identified by Collis (1994) and Winter (2003). We can augment these levels with additional constructs: the *enablers* or *inhibitors* which impact the successful deployment of dynamic capabilities. We address these later in the paper.

Methodological Issues

To conclude this section on examples of dynamic capabilities, and before we examine the link between dynamic capabilities and competitive advantage, we should like to comment on the current state of empirical studies in the field and the main challenges

facing researchers. We address this issue in the discussion when assessing the utility of the concept.

Pablo *et al.* (2007, 690) emphasize that 'while the dynamic capabilities framework is drawing support and increased validity by researchers, empirical studies of dynamic capabilities remain relatively rare'. This comment is easily understood, as arguably the most influential dynamic capability articles, those by Teece *et al.* (1997) and Eisenhardt and Martin (2000), use illustrative examples deriving from data that, while pertinent, were not collected purposively to understand dynamic capabilities.

There is an increasing range of conceptual elaboration about dynamic capabilities but empirical support is limited. This comment applies equally to the 'static' RBV. This may be due to a range of factors. First, as noted by Newbert (2007), it is hardly surprising that there is little empirical work, as the theoretical work did not start until Teece *et al.* (1997). Traditionally, research starts with first developing the theory, then developing some hypotheses or propositions; finally, those are empirically tested before managerial prescriptions are developed. Secondly, there may also be a lack of evidence, because these capabilities have been poorly specified, and hence researchers may not know what to look for. Thirdly, there may be little empirical research, because it is a concept 'which has thus far proven largely resistant to observation and measurement' (Kraatz and Zajac 2001, 653). Quantitative research studies easily outnumber qualitative studies in the strategic management field. While our review of examples is far from being exhaustive, it is interesting to note that, with the exception of Danneels (2002), the examples put forward are either conceptual ideas or derived from secondary data and are essentially results of quantitative studies. They also by and large describe broad organizational processes; they do not delve into the detailed, micro mechanisms of how these capabilities are deployed or how they 'work'. Where we are looking for differences across firms, for evidence of idiosyncratic and intangible phenomena (Rouse and Daellenbach 1999), we might question whether quantitative methods are particularly appropriate. Quantitative studies usually involve statistically valid large sample sizes which result in quantitatively aggregated responses in order to advance theory via the inference of common trends (Armstrong and Shimizu 2007), and it may be difficult to collect any longitudinal data via archival sources or structured surveys (Danneels 2007). Quantitative methods often involve the use of proxy variables which may only capture tangible and visible aspects of a phenomenon. Hence, as suggested by Lockett and Thompson (2001, 743), 'it may be necessary to sacrifice some of the generality of quantitative investigation for a more qualitative attention to detail', and they conclude that the best option may be to use a plurality of methods.

Qualitative, smaller sample studies are likely to be more appropriate for understanding the subtlety of resource creation and regeneration processes. To understand fully firm-specific resources, their context and how they were created or renewed in practice requires fine-grained investigations and to obtain rich and contextualized data qualitative fieldwork (Godfrey and Hill 1995; Rouse and Daellenbach 1999). These studies, however, are typically time consuming and demanding in terms of funding, access to firms and analysis. Danneels' (2008, 536) comment that 'notwithstanding its current popularity, the notion of dynamic capabilities is abstract and intractable' may remain true if we are unable to increase the number of qualitative field investigations.

Dynamic Capabilities and Value Creation

Dynamic Capabilities and Competitive Advantage

The literature is divided about the links between dynamic capabilities and competitive advantage (Cepeda and Vera 2007). Some works and notably Teece *et al.* (1997) make an explicit link between dynamic capability and advantage and, following Teece *et al.*'s (1997) lead, Griffith and Harvey (2006, 597) argue that 'a global dynamic capability is the creation of difficult-to-imitate combinations of resources [...] that can provide a firm competitive advantage' and Lee *et al.* (2002, 734) suggest that 'dynamic capabilities are conceived as a source of sustainable advantage in Shumpeterian regimes of rapid change'. While many similar definitions are used in the literature, the problem is that these definitions are often tautological. As noted by Cepeda and Vera (2007, 427), using a similar argument to Priem and Butler's (2001), 'if the firm has a dynamic capability, it must perform well, and if the firm is performing well, it should have a dynamic capability'.

Others have also linked dynamic capabilities to competitive advantage but have asserted that this link was indirect. For instance Zott (2003, 98) argues that 'dynamic capabilities are indirectly linked with firm performance by aiming at changing a firm's bundle of resources, operational routines, and competencies, which in turn affect economic performance'. Similarly, Bowman and Ambrosini (2003), following the RBV, suggest that the VRIN resource base is directly linked to rents, but as dynamic capabilities are one step removed from rent generation, their effect is indirect.

Finally, Helfat *et al.* (2007) have decoupled the notion of dynamic capabilities and performance and argue that 'dynamic capabilities do not necessarily lead to competitive advantage' (2007, 140). They explain that, while the dynamic capabilities may change the resource base, this renewal may not be necessarily valuable, it may not create any VRIN resources, i.e. the new set may either only give competitive parity or it may be

irrelevant to the market. Thus the effect of dynamic capabilities on advantage and performance may be negative. From this, we can therefore deduce that four different outcomes may result from the deployment of dynamic capabilities. First, they can lead to sustainable competitive advantage if the resulting resource base is not imitated for a long time and the rents are sustained. Second, they can lead to temporary advantage. Rindova and Kotha (2001, 1275) contend that in 'hypercompetitive environments, competitive advantage is transient rather than sustainable', competitive advantage can only be enjoyed for a short period of time. Third, they may only give competitive parity if their effect on the resource base simply allows the firm to operate in the industry rather than to outperform rival firms. Finally, the deployment of dynamic capabilities may lead to failure if the resulting resource stock is irrelevant to the market.

While Helfat *et al.* (2007) disconnect dynamic capabilities from advantage, they suggest that the performance of dynamic capabilities should be evaluated, and they propose two measures to do so. Those performance yardsticks are evolutionary fitness, which 'refers to how well the capability enables the firm to make a living by creating, extending, or modifying its resource base' (1997, 7), and technical fitness, which is about the quality dimension of capability performance. It captures 'how effectively a capability performs its intended function' (1997, 7). They also add that technical fitness together with market demand and competition influence evolutionary fitness, thus technical fitness does not automatically lead to evolutionary fitness (hence the need to decouple dynamic capabilities and competitive advantage). They are thus invoking the common managerial distinction between 'doing the right things' (evolutionary fitness) and 'doing things right' (technical fitness).

Further, if there is not a direct link between dynamic capabilities and competitive advantage, it can be suggested that dynamic capabilities do not have to be firm specific. Eisenhardt and Martin (2000, 1106) explain that the 'functionality of dynamic capabilities can be duplicated across firms, their value for competitive advantage lies in the resource configurations that they create, not in the [dynamic] capabilities themselves' and 'while dynamic capabilities are certainly idiosyncratic in their details, the equally striking observation is that specific dynamic capabilities also exhibit common features' (2000, 1108). They conclude that dynamic capabilities are equifinal, substitutable and fungible: many firms will have similar dynamic capabilities. Smart *et al.* (2007) argued that there was some evidence of network level dynamic capabilities in the biotech industry and Lampel and Shamsie (2003) demonstrated that, at least in the Hollywood movie industry, there was indeed some evidence of industry dynamic capabilities, i.e. dynamic capabilities that are similar across firms.

The Cost of Dynamic Capabilities

Dynamic capabilities are directed at the creation of future resources, which means that they are typically vulnerable to short-term pressures to trim costs, because whether their impact was valuable can only be assessed *ex post*. Zollo and Winter (2002) and Winter (2003) caution that the maintenance of dynamic capabilities is expensive, and that an ad hoc approach may be less costly: 'dynamic capabilities typically involve long-term commitments to specialized resources ... by contrast, the costs of ad-hoc problem solving largely disappear if there is no problem to solve.' (Winter 2003, 993). Lavie (2006) and Pablo *et al.* (2007) also address the cost of dynamic capabilities by suggesting that dynamic capabilities involve substantial cognitive, managerial and operational costs and that deploying dynamic capabilities requires high levels of time and energy from committed managers. Further, if managers misperceive the situation of the firm, they may trigger inappropriate dynamic capabilities. For example, they may decide to address a change in the market by reconfiguring and recombining some resources, e.g. consolidating manufacturing, eliminating a large number of smaller brands from the portfolio. However, it could be that the appropriate response would be to sustain the brand portfolio and to leverage their brand development capabilities. Hence, because of their misperception of the competitive landscape, they would have deployed dynamic capabilities that do not enhance or maintain performance. The firm will then experience both the costs of the dynamic capabilities as well as the negative consequences of their deployment (Zahra *et al.* 2006). This leads us back to our discussion on competitive advantage and the point that, although dynamic capabilities 'are developed in order to realize strategic advantages, their development does not ensure organizational success' (Zahra *et al.* 2006, 926). This also illustrates that we need to understand what triggers the deployment of dynamic capabilities. We turn to this issue next.

Internal and External Enablers and Inhibitors of Dynamic Capabilities

In their original work, Teece *et al.* (1997) explained that dynamic capabilities are processes shaped by positions and paths. We have described the processes earlier. They are the mechanisms by which the dynamic capabilities are put in use (Helfat *et al.* with Maritan 2007). Those processes include co-ordination and integration, learning and reconfiguration. Positions and paths are the internal and external forces enabling and constraining dynamic capabilities. 'Positions' are twofold. The internal position relates to the firm's assets i.e. its stock of technological, complementary, financial, reputational, and structural assets. The external position refers to the firm *vis-à-vis* its institutional environment and its markets. Teece *et al.* (1997) explain that the firm's position will

have a bearing on the firm's strategic posture and how competitive advantage could be gained.

'Paths' are about history and acknowledging that history matters, that 'bygones are rarely bygones' (Teece *et al.* 1997, 522) and that the firm's past and present guide and constrain its future. We now review this range of internal and external factors that trigger dynamic capabilities.

External Factors

The majority of the work on dynamic capabilities and the original work of Teece *et al.* (1997) assert that dynamic capabilities were necessary to deal with rapidly changing environments. However, Eisenhardt and Martin (2000) argued that they could also be used in moderately changing environments. They proposed that, in such environments, capabilities 'are detailed, analytic, stable processes with predictable outcomes' (2000, 1105), whereas in high-velocity environments 'they are simple, highly experiential and fragile processes with unpredictable outcomes' (2000, 1105). This means dynamic capabilities can vary with levels of dynamism in the external environment. This has led Aragon-Correa and Sharma (2003) to argue that we should work towards a contingency perspective on dynamic capabilities and recognize that environmental features such as uncertainty, complexity and munificence influence the deployment of dynamic capabilities.

If we acknowledge that dynamic capabilities can operate in relatively stable environments, some activities that are directed at the incremental development or enhancement of existing resources could be considered dynamic capabilities. For instance, we could envisage a situation where a firm embarks on a series of advertising campaigns to develop an existing brand. Owing to the perceived stability in this firm's environment, there is a strong belief, based on past experience, that advertising will have a positive and predictable impact on the brand. Similarly, firms that invest in R&D do so in the expectation that resources advantages in the form of superior product designs or productive processes will result. If these 'work', the outcome is a change in the resource base, and we can also see how these dynamic capabilities can be seen as being stable and repeated performances.

Winter (2003) also contends that the pace of change in an industry acts as a contingency factor in the decision to develop and deploy dynamic capabilities. Aragon-Correa and Sharma (2003) also add that exogenous factors affect each firm differently, as they are moderated by managerial perceptions.

Finally, it is worth re-emphasizing that 'history matters' for dynamic capabilities and has a critical influence. Adding to the strength of the theoretical argument, Madhoc and Osegowitsch (2000) have shown empirically in their study of the international biotechnology industry that path dependence was an important phenomenon in the dynamic capability perspective. Their study reveals that the country of origin of companies is a factor that shapes firms' history, their paths and positions and, as a result, impact on the dynamic capabilities they apply. They explain that the firms' country of origin shapes 'firms' experiences, and consequently the knowledge and capabilities they acquire' (2000, 326). They illustrate this by explaining how the emergence of the US biotech industry can be explained by strong links between universities and industries, entrepreneurship, availability of risk capital and governmental support, contextual factors that were not present to the same extent in other countries.

All this raises an interesting question about the nature or form of dynamic capabilities. Can a dynamic capability lie dormant until it is required? If it can, then there may be some effect on the performance of the dynamic capability if it has been unused for a period of time; or if the dynamic capability can only truly exist 'in action', then we should expect the organization to be in a continual state of change or 'becoming'. Maybe some dynamic capabilities can be 'stored', e.g. the ability to reconfigure, whereas others must continually be performed, e.g. R&D. This also suggests that, although a dynamic capability could exist in a stored or potential state, its effectiveness may degrade if the time lags between its deployments mean that the firm context is so altered that what was effective in the past is less effective in the present, even though the dynamic capability itself might be unchanged. Repeated past performance of a dynamic capability should not only improve its effectiveness through learning, it should allow for it to adapt incrementally to the changing internal and external context of the firm.

Internal Factors

Managers. Many scholars (e.g. Adner and Helfat 2003; Eisenhardt and Martin 2000; Helfat *et al.* 2007; Tripsas and Gavetti 2000) highlight the key role managers play in their firm's ability to adapt to new circumstances. They suggest that senior managers are critical determinants in the deployment of different forms of dynamic capability. To quote Teece (2007, 1346) 'dynamic capabilities reside in large measure with the enterprise's top management team' but, because of path dependency these dynamic capabilities 'are impacted by the organizational processes, systems, and structures that the enterprise has created to manage its business in the past'.

Harreld *et al.* (2007) suggest that one of the core aspects of the managerial role is to develop the firm's dynamic capabilities. They argue that managers need to be able to accomplish two tasks: 'first, they must be able to accurately *sense* changes in their competitive environment, including potential shifts in technology, competition, customers, and regulation' (2007, 24) and 'second, they must be able to act on these opportunities and threats; to be able to *seize* them by reconfiguring both tangible and intangible assets to meet new challenges' (2007, 25). Their capability to do so depends on their motivation, skills and experiences (Zahra *et al.* 2006).

This emphasis on the role of managers also means that what managers perceive their environment to be like (Adner and Helfat 2003) and their acumen (Conner 2007) are critical factors in understanding why and how dynamic capabilities are deployed. In other words, how managers interpret environmental issues, whether they perceive uncertainty and complexity, will affect their decisions and actions (Aragon-Correa and Sharma 2003). Aragon-Correa and Sharma (2003, 77) explain three forms of uncertainty: 'environmental state uncertainty occurs when managers perceive their general business environment or one of its components to be unpredictable; organizational effect uncertainty occurs when managers have difficulty understanding or predicting the impact of changes in the general business environment on their organizations; and decision response uncertainty occurs when managers perceive an inability or risk in predicting the consequences of individual decisions'. As far as complexity is concerned, they explain that 'the greater the number of factors in the general business environment a manager perceives she or he must deal with, and the greater the differences among those factors, the more complex the business environment' (Aragon-Correa and Sharma 2003, 79). Depending on how managers perceive these uncertainties in their environments, they are more or less likely to deploy dynamic capabilities. Aragon-Correa and Sharma (2003) suggest that firms with similar characteristics will deploy different dynamic capabilities because of their managers' perceptions. For instance, managers who perceive the environment to be complex may find it difficult to know which dynamic capability to use and may be unwilling to deploy any. In other words, they suggest that dynamic capabilities are contingent on both environment dynamism and on managers' interpretations of their business environment. This implies that the key issue here is not just the role of managers in the deployment of dynamic capabilities. It is their judgement about what dynamic capabilities to deploy, and how and where to deploy, which is critical to the ultimate successful performance of dynamic capabilities.

To reinforce this, we can note that Moliterno and Wiersema (2007, 1081) also assert that managers need to 'take as a given their bounded rationality, and can fully expect that their history, their expectations, and the probabilistic judgments that they make when

scanning the organizational context will have an impact on the way they manage the firm's portfolio of resources'. Tripsas and Gavetti (2000) illustrated the role of managerial cognition in dynamic capabilities with their exposition of how Polaroid's managers coped with the arrival of digital imaging, and how managers relied on cognitive simplification and past experience to process information. In their empirical study, Moliterno and Wiersema (2007) put forward that discrepancies between performance aspirations and perceived performance attainment also triggered dynamic capabilities. So, internal pressure to change or desire to change due to managers' dissatisfaction with current returns seems to matter as much as any other factors (Ambrosini *et al.* forthcoming). Managerial dispositions with respect to the deployment of dynamic capabilities are also influenced by the past and, more critically, how past experience will have shaped managers' perceptions. The managerial cognition field has developed rich insights into how managers' cognitive limitations impact their ability to sense and interpret the environment (Easterby-Smith *et al.* 2000; Ford 1985); and, as seen earlier, misinterpretation will negatively affect the decision to deploy dynamic capabilities. This reinforces the previous argument that both the actual environment and managers' perception matter when trying to understand whether and how dynamic capabilities are deployed.

Positions and paths. Positions and paths as noted relate to both external and internal factors. As far as internal factors are concerned two aspects are widely argued to play critical roles in the effective deployment of dynamic capabilities: learning and the existing set of resources. Eisenhardt and Martin (2000) explain that path-dependent learning mechanisms shape the creation and development of dynamic capabilities. They specifically report on the importance of practice and experience in the evolution of dynamic capabilities. Zollo and Winter (2002) add that a 'knowledge evolution cycle' enables firms to change the way they do things. They propose that 'dynamic capabilities emerge from the co-evolution of tacit experience accumulation processes with explicit knowledge articulation and codification activities' (2002, 344). It is interesting to note that this study is one of the very few to focus on the creation of dynamic capabilities; as we have illustrated, most focus on what dynamic capabilities are or on the role of managers in their deployment.

Building on Teece *et al.*'s (1997) principle that the past and present influence and constrain the future, Lavie (2006) contends that the existing resources of a firm, and how complex, causally ambiguous, embedded and interdependent they are, will influence the types of dynamic capabilities that can be deployed and their effectiveness. All this suggests that, in most cases, both the creation of dynamic capabilities, as they are deployed through learning and repetition (Zollo and Winter 2002), and their usage, as

they transform VRIN resources (Bowman and Ambrosini 2003), are likely to be path dependent.

Other factors. There are other internal factors that have been argued to impact upon the use of dynamic capabilities. Those include social capital, leadership and trust. Blyler and Coff (2003, 678) argue that 'social capital is essential for a dynamic capability in terms of facilitating the acquisition, integration, and release of resources'. They maintain that social capital and notably individuals' valuable internal and external social ties allow for information sharing, innovation and novel ways of thinking which in turn helps managers understand resource acquisition, integration and release.

Closely related to the role of managers and their perceptions, in his study of NCR, Rosenbloom (2000) demonstrated that leadership, the ability to make and break commitments, to take risk and to create an organizational learning culture were enablers of dynamic capabilities. Salvato (2003), in his study of Modafil and Alessi, also concluded that leadership played a critical role in the evolution of firms and their dynamic capabilities. Building on these two studies, Pablo *et al.* (2007) offer some evidence that, in addition to leadership, trust is a dynamic capability enabler, and, specifically, they were both critical agents of leverage. They contend that leadership and trust are essential in creating an organizational climate conducive to learning, to the use of dynamic capabilities and to resource creation in general.

Discussion and Synthesis

In Figure 1 we draw together our review of the dynamic capabilities literature. The centre of the figure links the various elements in the firm value creation process. Dynamic capabilities directly impact the resource base of the firm, which in turn is the source of the firm's competitive advantage. The literature identifies some of the precursors to the formation of dynamic capabilities which we have labelled DC creation processes. This is to acknowledge that dynamic capabilities do not appear as a fully formed capability; they are typically the outcome of experience and learning within the organization.

Dynamic capabilities impact firm value creation via their impact on the resource base. These impacts can result in competitive advantages which may be temporary or sustained, depending on the dynamism in the environment. It is possible, then, that resource-based advantages might be short-lived, owing to changes in customer and/or competitor behaviour. The RBV is an explanation of why economic profits might accrue to a firm in equilibrium. If we accept that equilibrium conditions might only obtain for

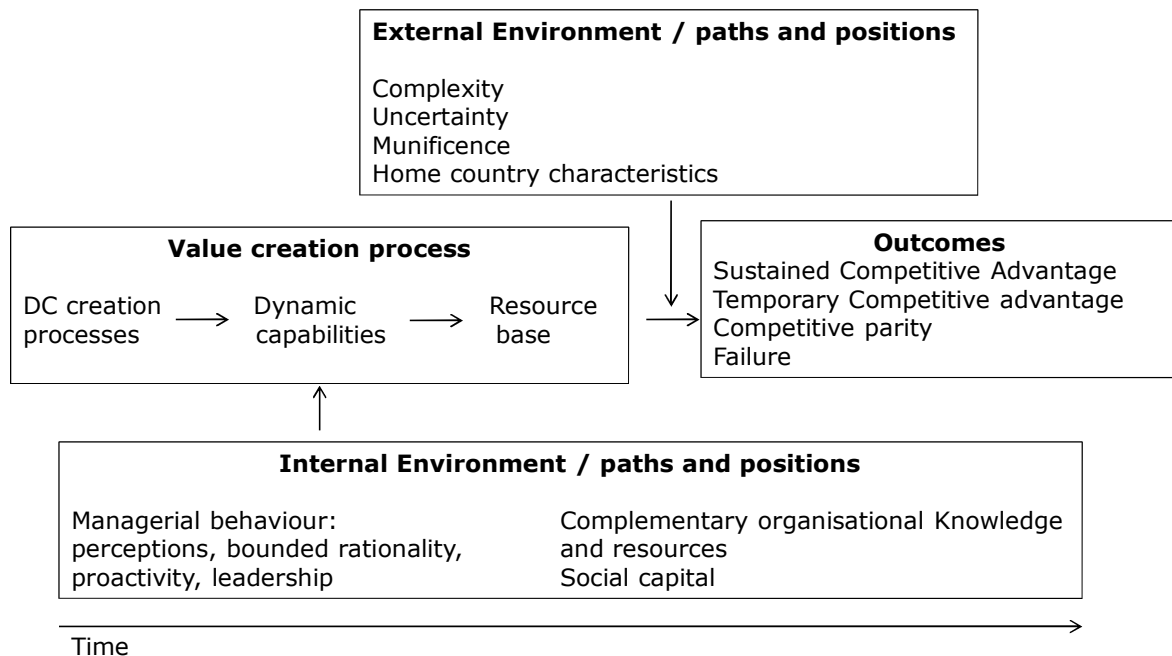


Figure 1. Dynamic capabilities

short periods of time, it is possible to consider a firm experiencing sustained advantage in dynamic environments, but not from a *static* resource base. Rather the dynamic capabilities enable the firm continually to refresh the resource stock so that the firm can continue to 'hit a moving target'. In this way, advantage is sustained through the achievement of a continuous sequence of temporary, short-lived advantages. It can be suggested that, owing to time lags and uncertainty, the deployment of dynamic capabilities might not actually lead to the creation of new resource-based advantages (Danneels 2008). Thus the 'outcomes' include situations of competitive parity and even failure. Moreover, the maintenance of dynamic capabilities can involve the firm in incurring considerable expenditure, e.g. employing post-acquisition integration specialists, R&D costs, training, etc. In addition, the opportunity costs of 'regular' staff who are diverted and distracted from their normal work in times of organizational change should be factored in to any evaluation of the contribution of dynamic capabilities to the firm's performance. So even where we might be able to attribute the creation of new resource-based advantage to specific dynamic capabilities, any ensuing rents must be considered alongside the costs of maintaining the capabilities (Winter 2003).

The deployment and performance of dynamic capabilities is moderated by a variety of internal and external variables, as depicted in Figure 1. The internal 'paths and positions' that have a moderating effect include managerial behaviours and perceptions, and the presence of complementary assets and resources. These internal paths and positions influence the deployment of dynamic capabilities. The external environment exerts a moderating influence, particularly on the linkages between the deployment of dynamic capabilities and competitive advantage.

Underpinning the figure is 'time', which works from left to right. This is an acknowledgement that the development, deployment and outcomes of dynamic capabilities unfold over time, and the time lags between action (deployment) and outcome clearly introduce causal ambiguity into the managerial decision processes. Ambiguity is caused internally where there is no clear understanding of the links between dynamic capabilities and actual resource creation, and these uncertainties are exacerbated where there is a long lead-time between decisions to change the resource stock and the resultant impacts on performance.

To avoid the problems of tautology mentioned earlier, for dynamic capabilities to be a useful construct it must be feasible to identify discrete processes inside the firm that can be unambiguously causally linked to resource creation. However, as Figure 1 illustrates, there is 'many a slip twixt cup and lip' in the deployment of dynamic capabilities. Long time lags between the deliberate decision to deploy dynamic capabilities and the subsequent resource stock outcomes clearly exacerbate the problem of identification. Even where we might expect the deployment of dynamic capabilities to have a fairly immediate impact, the complexity and uncertainty of the internal and external environments would make it difficult clearly to associate the change in resource stock to specific actions and processes.

Moreover, to date we have little theoretical or empirical evidence on which to base any suggestions as to how dynamic capabilities can be deliberately built. There is a view that these dynamic capabilities might be commonly found within an industry, and that they may not be differentiated across a collection of firms. This would imply that these dynamic capabilities might be relatively easy to build. However, and invoking an RBV perspective on uniqueness, we would argue that dynamic capabilities are only likely to be similar across firms if we adopt a high-level, abstracted conception of them. Feldman and Pentland (2003) distinguish between ostensive and performative aspects of routines. The ostensive aspect of the routine is the structure or abstract understanding of the routine, and the performative aspect is the actual performance of the routine (Feldman and Pentland 2003). If dynamic capabilities are indeed repeated performances, they are

akin to high-level organizational routines (Collis 1994; Zott 2003). The ostensive routine, i.e. the abstract description of the dynamic capability, might be very similar across competing firms, e.g. 'we all do R&D'. However, we should expect that the performative aspect of the routine, the dynamic capability *in practice*, would display subtle but important differences between firms. In addition, even where the performative capability was identical across firms, the supporting and complementary processes and assets would be most likely to be differentiated, thus the effect of the common capability would be variable.

If we consider the managerial utility of the construct, we can see some of the challenges facing those seeking to assist and advise executives in the strategic management of their firms. Time lags, complexity and uncertainty would suggest we should be cautious in making any strong assertions about the links between action and outcomes. So, informed by the dynamic capabilities perspective, what advice would we give to managers? Would we suggest that all firms facing a dynamic environment need to have dynamic capabilities? If so, can we offer any advice about which dynamic capabilities should be developed? Is it possible to develop a contingency or diagnostic approach that would have utility, e.g. 'if the environment looks like this, you need dynamic capabilities that look like that'. And if this were possible, what would the contingency variables be?

Dynamism in the environment can mean rapid but predictable change, or it could mean uncertainty (Aragon-Correa and Sharma 2003). This distinction is critical in the development of any prescriptive approach. Rapid but predictable change can be addressed by well-understood change processes that are likely to have been developed deliberately through time, and where the links between action and outcomes are fairly clear, informed by reflections on repeated applications of these processes in the past. These change processes could indeed be stable features of the organization, and they may well appear to be similar across firms in the same industry, as argued by Eisenhardt and Martin (2000). Environmental uncertainty presents quite different challenges. Options for executives would range from deciding on one course of action and sticking to it, to building a high degree of adaptive capability (Wang and Ahmed 2007). Clearly, there are different risks with both of these. The first option runs the risk of picking the wrong course, the second may be inordinately costly if the firm is facing competitors who have chosen a particular path and who have not incurred the costs of building and maintaining capacity to adapt and flex the organization.

Figure 1 illustrates the challenges facing those wishing to advise and influence executives. Each arrow horizontally linking the stages of resource creation is moderated

by internal and external paths and positions. As mentioned in the text, as things stand we are unclear about:

1. how dynamic capabilities are created
2. what is the full range of dynamic capabilities which exist in practice rather than theory
3. how these dynamic capabilities operate singly or in combination
4. which dynamic capabilities might be more effective in what kind of firm situations
5. the extent to which newly created resources can be attributed to specific dynamic capabilities, to luck, exogenous changes, etc.

Answers to these questions would go a long way towards establishing dynamic capabilities as a theoretically well-founded construct and one that is managerially relevant. If we understand how, in practice, dynamic capabilities are created, this would allow us to start developing guidance for managers about how they can deliberately develop dynamic capabilities. It would also allow us to understand better how other factors can create new resources and hence provide some evidence to help managers find the right solutions for their firms when in need of resource renewal. Answering these questions would also facilitate our understanding of how contingent on the perceived and actual environment the effective deployment of certain types of dynamic capabilities is and, similarly, it would allow the design of managerial relevant prescriptions.

Conclusion and Further Research

'The theoretical and practical importance of developing and applying dynamic capabilities to sustain a firm's competitive advantage in complex and volatile external environments has catapulted this issue to the forefront of the research agendas of many scholars' (Zahra *et al.* 2006, 917). So, the dynamic capability approach is receiving more and more attention, and it focuses attention on the firm's ability to renew its resources in line with changes in its environment. This approach is seen to be an offshoot of the RBV (Cavusgil *et al.* 2007; Teece *et al.* 1990) as it provides some explanation as to how the current stock of VRIN resources, upon which the RBV has focused, can be regenerated. The turbulent and changing nature of the environment suggests that resources cannot remain static and still be valuable. They must be continually evolving and developing, otherwise firms may only be able to be competitive in the short term. To have a persistent competitive advantage, firms must continue to invest in and upgrade their resources to create new strategic growth alternatives. They must possess some dynamic capabilities. These capabilities are organizational processes that alter the resource stock by creating, integrating, recombining and releasing resources (Eisenhardt and Martin

2000; Teece *et al.* 1997). These dynamic capabilities are shaped by enabling and inhibiting variables within and outside the firm, including the perceptions and motivations of managers. In this paper, we have reviewed and synthesized the current literature. This has allowed us to present a clear view of the scope of the concept, what the antecedents of dynamic capabilities are, and how the link to competitive advantage should be considered. We have also discussed the inconsistencies in the literature and raised questions about the utility of the concept.

There are few empirical studies in the dynamic capabilities field (Pablo *et al.* 2007). One of the difficulties could come from the seeming dominance of quantitative studies. Studies might *infer* the presence of dynamic capabilities by examining firm performance outcomes. However, this approach compounds the problem of tautology in the literature. What we need are fine-grained case studies of firms who have sustained advantage over time in dynamic environments. If we could accumulate enough case-based data, it might be possible to identify the more common dynamic capabilities, and generally to explore the model in Figure 1. We should also add that field research would also allow researchers to address the micro-process question of how and why managers use dynamic capabilities (Pablo *et al.* 2007) and, by doing so, we could employ a strategy-as-practice lens (Jarzabkowski *et al.* 2007; Johnson *et al.* 2003). The strategy-as-practice perspective is concerned with what people do. It is interested in examining how and why some concrete activities could be linked to strategic outcomes. By taking such a micro approach, one might be able to obtain some concrete evidence of what dynamic capabilities look like in organizations, how they are deployed, and how context may impact upon them. So by looking at the detail of how dynamic capabilities are deployed, we should be able to understand better the dynamic capabilities *in practice* and whether and how they might differ across firms, which could form the basis for developing managerial prescriptions.

Much more is needed before we can have a full understanding of what dynamic capabilities are, how they work and whether there are, for instance, patterns across industries or size of firms or age of firms. Thus, there may be opportunities to develop a contingency approach to dynamic capabilities.

The dynamic capabilities field has advanced considerably in the decade since Teece *et al.*'s (1997) original contribution. We believe the priorities for the future would be to clarify some of the concepts that seem to be open to differing interpretations, to embark on appropriate empirical research that would enable us to test as mentioned above, for example, how generic or context specific are these capabilities, and finally, we should encourage scholars to look to integrate the dynamic capabilities perspective into other

complementary fields of enquiry, e.g. innovation, knowledge management, organizational change and development and organizational learning. If the concept of dynamic capabilities is to be useful for strategic management as a field of study and for practitioners, it needs to be fully researched, and we will need to be able to answer positively the questions Collis was raising in 1994: 'Where does this leave organizational capabilities? And how valuable are they as sources of sustainable competitive advantage?' (Collis 1994, 150). 'It depends' was his answer then. Do we know much more now?

Note

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